Forest Tent Caterpillar in the Upper Midwest

United States Department of Agriculture

Forest Service

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Information Sheet

Figure 1 - *Forest tent caterpillars.*

The forest tent caterpillar (FTC), *Malacosoma disstria*, is a native species found throughout hardwood forests of North America. It feeds on the leaves of many trees, but in Michigan, Minnesota and Wisconsin, outbreaks occur in aspen, birch, basswood and oak stands. Sugar maple is a favorite host in Michigan's Lower Peninsula, but is not highly preferred in other parts of the Midwest. Regional outbreaks occur at 5-15 year intervals, each outbreak lasting 2-5 years. At the peak of an outbreak, millions of acres of trees can be stripped of their leaves by mid-summer.

Identification

Figure 2. - *The moth stage of forest tent caterpillar.*

Newly hatched larvae are about one-eighth inch (3 mm) long, black in color with conspicuous hairs. With each successive molt, bluish lines develop along the sides of a brownish body and a row of "footprint-shaped" white spots develop along the back. When full-grown, caterpillars are about 2 inches long (50 mm) (fig.1). The moth stage of FTC is light brown with a wingspan of 1 to 1 1/2 inches (25-38 mm). The forewings have two darker lines (fig. 2). Egg masses encircle twigs and are dark gray to black and covered with a frothy, glue-like substance (fig. 3). Each egg mass contains 100-350 eggs.

FTC is often confused with a close relative, the eastern tent caterpillar. Despite its name, FTC does not form a tent. Rather, young caterpillars make a pad of silk where they rest and molt. Eastern tent caterpillars make a neat silken tent (fig. 4). Also, the eastern tent caterpillar feeds almost exclusively on cherry, apple and plum trees. Gypsy moth caterpillars are sometimes confused with FTC. Both are feeding in early spring on many of the same trees, and can occur in large masses. However, gypsy moth caterpillars look quite different having pairs of blue and red bumps on their backs (fig. 5).

Figure 3. - *Forest tent caterpillar egg mass*

Figure 4. - *Tent formed by the eastern tent caterpillar. FTC does not form a tent.*

Figure 5. - *Gypsy moth caterpillar (above) and forest tent caterpillar (below).*

Life History

FTC has one generation per year. Caterpillars emerge from over-wintering eggs in the spring when the new leaves are beginning to unfold. Young caterpillars stay together and move about in a single file, following silk trails. They often congregate to rest or molt on silken mats found on the trunk or branches. Five to six weeks after hatching the caterpillars finish feeding and spin cocoons of yellow silk in folded leaves (fig. 6), bark crevices or other sheltered areas. In these cocoons, the caterpillars change to pupae. The adult moths emerge about 10 days later. The moths are night fliers and are attracted to lights so many egg masses are often located in well-lit areas. After mating the female moth lays eggs, generally in the upper crown of a host tree.

Figure 6. - *Leaves tied together with silk. A cocoon is inside the rolled leaves*

Natural Control

FTC populations fluctuate greatly, with huge outbreaks followed by years where a single caterpillar can be hard to find. What starts an outbreak is poorly understood. Prior to most outbreaks, localized pockets of defoliation are observed. Within a year or two, these small areas blossom to include millions of acres. Several factors can terminate an outbreak or lessen its intensity. Freezing weather just prior to, during, or following egg hatch, can

Figure 7. - Sarcophaga aldrichi, *a native parasitic fly that attacks forest tent caterpillar pupae. They often become very abundant near the end of an outbreak.*

kill eggs and young caterpillars. Starvation can occur when millions of caterpillars literally eat all of their food supply. The resulting starvation leads to disease epidemics. FTC has natural enemies that include parasites, predators and pathogens.

In the Upper Midwest, one of the more common natural enemies of FTC is a large gray fly called *Sarcophaga aldrichi* (fig. 7). This fly is locally referred to as the "friendly fly" or the "government fly". It is a native parasite that has evolved with FTC. It lays tiny maggots on the cocoons of FTC. The maggots eat the developing pupa inside a cocoon. *S. aldrichi* becomes very numerous near the end of outbreaks. In many cases the flies become more of a nuisance than the caterpillars. This fly does not bite but often lands on people, laundry, and light colored cars and siding. Natural enemies become more and more common during outbreaks and after 2-5 years they are killing so many FTC that the outbreaks subside.

Impact of FTC on Trees

During outbreaks, all of the leaves of host trees can be eaten by mid- to late June (fig. 8). These trees can "reflush" new leaves but these leaves are often smaller in size. Producing new leaves stresses trees since they must use stored starch reserves that would normally be used for protection or growth. This weakens a tree and makes them prone to other problems. In most cases, conditions return to normal and the trees recover. However, a drought or additional stress like another insect outbreak can further weaken trees, resulting in declining health and even tree death.

In forest stands tree mortality is not common following an FTC outbreak. Rather, growth loss is the major impact. In aspen, a single heavy defoliation can reduce growth by 50-60 percent in that year. Two years of heavy defoliation reduces growth by up to 90 percent. However, within a year after an outbreak, growth generally recovers to normal levels.

Figure 8. - *Aspen trees in early July following a forest tent caterpillar outbreak. The fir trees under the aspen were not fed upon.*

Certain risk factors can increase the likelihood of trees dying. Tree age, tree species, site quality and weather can all interact to increase or decrease tree mortality. Older trees are more

likely to die than younger ones. Oaks and paper birch appear to be more at risk than aspen or sugar maple. Trees growing under less than ideal conditions are more prone to die. As an example, surveys in Minnesota found more dead aspen trees on wet sites following an FTC outbreak. Drought conditions would also make tree mortality more likely.

Applied Control

Small landscape trees and shrubs can be protected by hand removal of egg masses or caterpillars. However, during large outbreaks many thousands of caterpillars will crawl long distances to find new food. This can make hand control very difficult. In addition, egg masses are often laid in the upper parts of trees making them hard to reach.

FTC can be controlled using insecticides. County extension or state forestry offices should be contacted for a list of insecticides registered for use against FTC. One effective insecticide against young caterpillars is Bacillus thuringiensis var. kurstaki, known as Btk. This product is preferred because it has fewer "non-target" impacts than conventional broad-spectrum insecticides.

One other practice that may be helpful would be turning outside lights off during the moth flight period in mid-summer. This may prevent moths from congregating and laying eggs in well-lit areas.

Landscape trees should be maintained in a healthy condition before, during and after outbreaks through watering, proper pruning and mulching. Healthy, well cared for trees will survive even complete defoliation

For Further Assistance

Local information can be very helpful when considering a treatment program or when you are concerned about local impacts on trees or forests. Sources of reliable information on FTC as well as on other forest and shade tree insects are readily available.

In Michigan, county extension offices provide information on a variety of forest and shade tree insects. In addition, the Michigan DNR has forest health specialists located at Regional Offices in Roscommon and Marquette. You can also visit the DNR forest health unit web site at:

http://www.michigan.gov/dnr/0,4570,7-153-30301_30830---,00.html

In Minnesota, local DNR foresters can provide information and assistance. In addition, DNR forest health specialists are located at Regional offices in Grand Rapids, Rochester and St. Paul. County extension offices also provide information on a variety of tree related insect and disease concerns. You can also visit the DNR forest health unit web site for specific information on FTC at:

http://www.dnr.state.mn.us/treecare/forest_health/ftc/index.html

In Wisconsin, local DNR foresters can provide information and assistance. In addition, DNR forest health specialists are located at Regional offices in Eau Claire, Green Bay, Madison, Rhinelander and Spooner. County extension offices also provide information on a variety of tree related insect and disease concerns. You can also visit the DNR forest health unit web site at:

http://dnr.wi.gov/topic/ForestHealth/

The USDA Forest Service maintains a forest health protection unit with insect and disease specialists in St. Paul, MN. This group provides service to National Forests, National Parks and other federal lands and cooperates with various state agencies. They can be contacted at the address listed below:

USDA Forest Service
Internet: Forest Health Protection
1992 Folwell Avenue
St. Paul, MN 55108

Pesticide Precautionary Statement

This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered.

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